



DESERET CHEMICAL DEPOT



TOCDF | DCD | CAMDS

CREATING A SAFER TOMORROW
www.cma.army.mil



TO THE CITIZENS OF TOOELE COUNTY

The Deseret Chemical Depot (DCD) has been dedicated to safely storing and maintaining chemical munitions for more than six decades, while the Tooele Chemical Agent Disposal Facility (TOCDF) has been safely destroying them since 1996.

Our sincere gratitude goes out to each and every one of our workers, who have dedicated their skills, knowledge and energy to this mission. These men and women have stored, transported and destroyed these weapons while carrying out DCD and TOCDF's cornerstone value of safety first. They will continue to make safety their number one priority until the entire stockpile of chemical weapons is destroyed to ensure the protection of our communities, the environment and themselves.

As we begin preparing and planning for closure, the reality of what this actually means is beginning to set in. As we get closer to ridding our country, state and nation of these chemical weapons, we also are closer to no longer requiring the services of those who have been so committed to seeing this mission to the end. It is extremely important to us that we continue to prepare our work force for life after DCD and TOCDF, either by continuing to provide additional education, offering early retirement incentives or facilitating other job placements.

The support of our neighbors in our surrounding communities has also been invaluable. Without your support, we could not have achieved so much. We are grateful for the trust and cooperation you have given us over the years and hope we will continue to have both as we approach the end of operations and transition to facility closure.

We have reduced more than 99 percent of the risk to our communities and environment by eliminating DCD's stockpile of nerve agents GB and VX. And we are pleased about making such great progress with the destruction of our mustard agent stockpile. We have fine-tuned the facility's systems to ensure they will work safely at maximum efficiency for the remainder of our disposal operations.

We are also looking forward to the disposal of our last remaining agents—GA (Tabun) and lewisite, as well as the secondary waste that has been generated throughout storage and destruction. These missions will be accomplished in an environmentally sound and safe manner as are all our operations at DCD.

We are proud of the accomplishments we have made to help create a safer tomorrow for our local communities, the nation and the world. Safely eliminating our stockpile of aging, deteriorating chemical weapons from our community will be an achievement that should make us all proud—a legacy we all will celebrate.

Sincerely,



Colonel Mark B. Pomeroy
Commander
Deseret Chemical Depot



Ted Ryba
U.S. Army Site Project Manager
Tooele Chemical Agent
Disposal Facility



Gary McCloskey
Vice President & General Manager
URS (formerly EG&G Inc.)

DCD | DESERET CHEMICAL DEPOT

In the early 1940s, the U.S. Army chose Utah's Rush Valley to store part of its chemical weapons stockpile. It was the area's topography, the Army said, that made it such an ideal location: remote, dry and guarded by mountains to the east and west. With that in mind, a new depot was built approximately 20 miles south of Tooele and on July 11, 1943, an official inauguration ceremony was held for the Deseret Chemical Warfare Depot (DCWD).

The depot, now known as the Deseret Chemical Depot (DCD), covers nearly 20,000 acres and includes the Tooele Chemical Agent Disposal Facility (TOCDF) and the Chemical Agent Munitions Disposal System (CAMDS). The TOCDF is where DCD's chemical munitions are destroyed; it was the first full-scale operating chemical weapons destruction facility in the continental United States. CAMDS once served as the primary research, test and development facility for the nation's chemical weapons elimination program and is currently undergoing closure.

DCD has been storing chemical weapons since 1942. Prior to disposal operations, the depot stored 13,617 tons of chemical agents, which totaled 44.5 percent of the nation's original stockpile—the largest-single stockpile of chemical weapons in the United States. DCD's original stockpile consisted of rockets, bombs, mines, bulk containers, spray tanks, cartridges and projectiles containing nerve agents GA, GB and VX or blister agents mustard and lewisite.

Chemical weapons are safely stored in earth-covered igloos that help protect them from damage caused by deterioration and potentially threatening weather-related events. Experienced and trained workers monitor the igloos, routinely check for leaks and inspect the condition of the weapons and facilities.

It is anticipated that all chemical weapons stored at DCD will be destroyed in time to meet the April 2012 Chemical Weapons Convention Treaty deadline. Hundreds of skilled workers are focused on safely accomplishing this task. Only when all of the chemical weapons and agents are destroyed will the hazards associated with storing them be completely eliminated for the community, the workers and the environment.



DCD FACTS

Since its existence, the Deseret Chemical Depot has had several names, including: Deseret Chemical Depot Warfare Depot (1943), Western Chemical Center (1947), Deseret Chemical Depot (1950), Deseret Depot Activity (1955), Tooele Army Depot South Area (1962), Tooele Chemical Activity (1993) and Deseret Chemical Depot (1996)

The depot originally had 42 miles of railroad tracks; 32 miles are scheduled to be recycled.

THE DEPOT HAS A NUMBER OF HISTORICAL SITES ON PROPERTY:

- Johnson Cemetery – contains the remains of several settlers who homesteaded the area in the late 1800s. Thirteen grave plots have been discovered; three are marked by headstones.
- World War II POW Camp – One of 12 locations in Utah to house POWs. The camp operated from November 1944 to July 1945 and housed both German and Italian prisoners. The site has since been demolished.
- Pioneer Homesteads – There are two historical homesteads on depot property; the Stookey homestead and the Johnson homestead.

Rainbow Reservoir is located on the depot. DCD annually hosts a fishing day for special needs children.

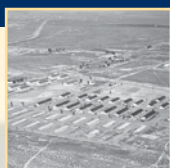


TEAM DESERET TIMELINE

FEBRUARY: Maj. Gen. William N. Porter, Chemical Warfare Service chief, selects Rush Valley as the depot's location

1942

JUNE: Installation officially named Deseret Chemical Warfare Depot (DCWD)



1943

JULY 11: Dedication and flag raising ceremonies conducted



U.S. Army determines a new technology is required to dispose of chemical munitions

1960s

DCD realigned under Tooele Army Depot and renamed Tooele Army Depot South Area

1962

Concept developed for a transportable disposal facility to destroy chemical weapons

1970





CAMDS FACTS

Original plans were to create a mobile facility to dispose of munitions at several stockpiles around the country. Plans eventually evolved into a permanent facility.

It took four years to construct CAMDS, from 1974 - 1978.

CAMDS started disposal operations on Sept. 16, 1979 with the destruction of the first M55 GB nerve agent rocket.

One of CAMDS' first projects was to develop an industrial-scale neutralization process. CAMDS abandoned its neutralization research in 1981 to develop baseline incineration technology, including the liquid incinerator. CAMDS returned to neutralization in 1995 to provide support to the Alternative Technology and Approaches Program.

In 1985, CAMDS workers created a new kind of rocket shearing blade that made M55 rocket processing dramatically quicker and accelerated the rocket disposal campaign.

A new self-contained demilitarization protective suit was specially developed for CAMDS workers to wear while in toxic areas of the plant. Approximately three years and \$7 million went into developing the suit. Back then, the protective suit cost about \$80 each; its modern-day counterpart costs approximately \$360.

The technologies tested at CAMDS provided the basis for the design of the first full-scale disposal facility, located on the Johnston Atoll in the Pacific.

In a *Salt Lake Tribune* article published on Sept. 20, 1999, reporter Brent Israelsen reported that "CAMDS arguably is one of the best things the U.S. Army has done for humanity in the past few decades."

CAMDS senior personnel, the go-to people for solving all types of chem demil issues, were known as the "grey beards."

In September 2007, as part of closure-related activities, CAMDS' most noticeable landmark, the massive water tower that reached 120 feet high, came crashing to the ground. The metal water tower was chopped up and recycled.

A vintage railcar housed two generators and served as a backup power source at CAMDS until 1993. In 2008, the railcar was transported to the Utah State Railroad Museum, where it is now on display.

CAMDS | CHEMICAL AGENT MUNITIONS DISPOSAL SYSTEM

The Chemical Agent Munitions Disposal System (CAMDS) is currently undergoing closure; all of its facilities and equipment are being decontaminated, dismantled and disposed of.

Located on the Deseret Chemical Depot, CAMDS was once the primary research, test and development facility for the nation's chemical weapons elimination program. The CAMDS started operations in September 1979 and during its existence, workers destroyed more than 363,000 pounds of chemical agents and more than 40,000 munitions, while pioneering most of the processes still used today at U.S. stockpile facilities. CAMDS developed and demonstrated techniques including chemical munitions handling/disassembly, incineration, pollution abatement systems, neutralization, personal protection equipment and secondary waste treatment.

While CAMDS will soon be gone, its contributions to the U.S. Army's mission to safely destroy chemical weapons will forever remain immeasurable.



TEAM DESERET TIMELINE

Concept of transportable facility evolves into a permanent facility



AUG. 19: HD mustard agent-filled projectiles transferred to Tooele Army Depot South Area from Tooele Army Depot North Area



SEPTEMBER: CAMDS begins operations, demonstrating various technologies and techniques to dispose of DCD's chemical weapons stockpile in safe, environmentally sound and cost-effective ways



1974

1977

1978

1979

1980

1981

CAMDS constructed at Tooele Army Depot South Area to research and develop disposal methods

An additional 68 steel-arch storage igloos are constructed

AUGUST: Tooele Army Depot South Area receives weteye bombs from Rocky Mountain Arsenal

TOCDF | TOOELE CHEMICAL AGENT DISPOSAL FACILITY

Using sophisticated technology for chemical weapons disposal, the U.S. Army is committed to its partnership with Congress; federal, state and international agencies;

local officials and community residents to safely destroy Deseret Chemical Depot's (DCD) chemical weapons stockpile. The TOCDF began operations on Aug. 22, 1996.

To date, workers have safely destroyed the entire stockpile of GB and VX nerve agents and are in the process of the disposing of mustard agent. Elimination of the remaining stockpile of mustard agent, along with small quantities of lewisite and GA agents, will represent complete disposal of the DCD stockpile.

PLANT DESIGN AND SYSTEMS

Situated on 36 acres, the TOCDF is engineered with specially designed weapons handling processes, remotely controlled disposal equipment, complex control systems and detailed procedures and training to protect the workers and the environment.

The technology used in the plant is a result of years of experience and advancements developed from operating the Chemical Agent Munitions Disposal System (CAMDS), a former research and development facility also located at the DCD, and the Johnston Atoll Chemical Agent Disposal System (JACADS), formally located on an atoll 800 miles southwest of Hawaii.

Using lessons learned from CAMDS, JACADS and other destruction facilities, additional safety features have been built into the design of the Tooele plant, including multiple backup systems to safeguard employees and contain any hazardous material.

The cascading air filtration system protects workers and the environment by continuously moving air from areas free of agent contamination into agent-contaminated areas and then through charcoal filters. This negative air pressure system guarantees both clean air for the workers and total containment of agent.

(continued on page 5)



TOCDF FACTS

The TOCDF is the only U.S. chemical weapons facility to destroy more than one million munitions—*DCD's stockpile originally had the widest variety of chemical munitions and agent, and was the largest stockpile in the nation.*

After completion of disposal operations, TOCDF will have destroyed more than 13,600 tons of liquid agent—*GA, GB, VX, mustard and lewisite agents*—which would be enough to fill more than four Olympic-sized swimming pools.

TOCDF's fame and fortune was debuted on two national television programs; the History Channel's *Modern Marvels* in 2007 and the Travel Channel's *10 Most Forbidden Places* in 2001.

The Heel Transfer System, created to efficiently deal with excessive heels in the mustard bulk containers, was designed and built by TOCDF workers, who in turn, were asked to build one for the Umatilla, Ore. disposal facility.

The TOCDF's chemical agent monitoring systems are so sensitive in detecting low-level agent concentrations, that if the monitors were looking for bad apples, they could easily detect one bad apple hidden in two million barrels of good apples.

TOCDF employee "Ironman Dan" has achieved a career milestone that nobody else in the U.S. chemical weapons destruction program is likely to achieve: more than 1,300 demilitarization protective ensemble entries (and counting) into the plant's toxic areas to perform various maintenance jobs.

Due to the large amount of GB munitions in the DCD stockpile, which originally consisted of more than 80 percent of the total munition stockpile, TOCDF was able to recycle approximately 23,000 tons of metal from the GB bulk containers, MC-1 bombs, 105mm and 155mm projectiles.



JUNE 30: State of Utah grants Army permission to build the Tooele Chemical Agent Disposal Facility (TOCDF)

SEPT. 1989 - JULY 1993: Construction of the TOCDF

AUG. 1: TOCDF systemization commences

1984

Army unveils plan to incinerate chemical weapons at various depot locations, including Tooele Army Depot South Area

1989

SEPT. 6: TOCDF contract awarded to EG&G Defense Materials Inc., now formally URS



1993

JAN. 13: The United States signs the Chemical Weapons Convention, an international treaty that prohibits the development, production, stockpiling, transfer and use of chemical weapons, calling for the elimination of stockpiles





(continued from page 4)

Before the plant was allowed to begin operations, workers performed a lengthy process called systemization, which tested the reliability and efficiencies of all equipment. Systemization ensured that individual equipment components operated as designed and were integrated correctly with all other equipment, such as sensors, robotics, conveyors and controls.

More than 1,000 skilled workers, including scientists, engineers, technicians and support personnel, help operate and maintain the plant. Workers must complete extensive training and demonstrate proficiency before they are allowed to operate the equipment or handle the munitions, and further training is on-going.

When the stockpile is destroyed, the Army plans to close the plant in accordance with the state of

Utah, U.S. Environmental Protection Agency and congressional guidelines.

DISPOSAL PROCESS

The disposal process begins with the movement of the chemical weapons from the storage area. The weapons are placed in specially designed protective containers before being transported a short distance from the storage area to the plant. The containers are monitored for chemical leaks before the weapons are unpacked for disassembly and/or removal of liquid agent. Disassembly occurs inside a sealed building by remotely controlled equipment. The disassembly process separates the agent, metal parts and explosive components of each munition. Each munition component is destroyed separately in incinerators specifically designed to ensure safe destruction and decontamination. A pollution abatement and

filtration system for each incinerator ensures furnace exhaust is environmentally safe, meeting strict regulations before release into the environment.

Control room operators oversee the entire process by using computerized, interactive sensors and video cameras to safely monitor the plant processes.

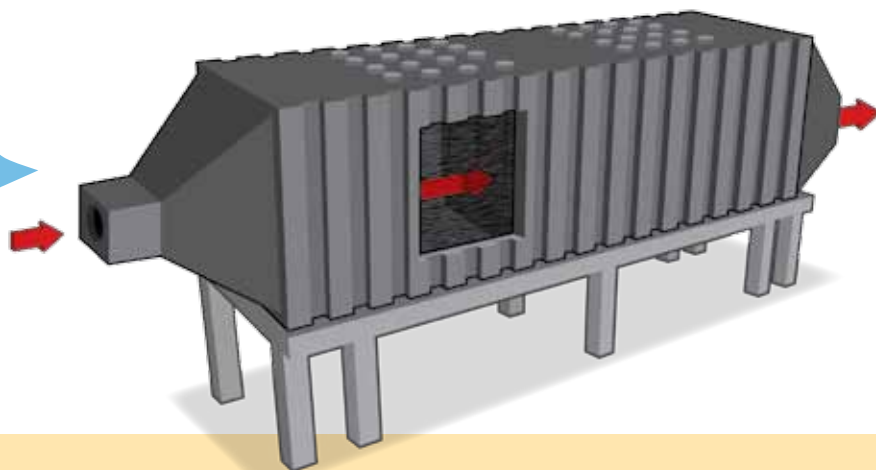
DISASSEMBLY AND DRAIN

All of the explosively-configured munitions slated for destruction at the TOCDF have been destroyed. These munitions required special care through the disposal process.

All munitions with explosive components were carefully loaded onto a conveyor and sent to the explosive containment room.

SOME INTERESTING TIDBITS on the Pollution Abatement System Filtration System:

- The sulfur-impregnated carbon, which captures the mercury, is made from burnt coconut shells.
- One tablespoon of the sulfur-impregnated carbon has as much surface area as one pro football field.
- Each of the three filters contains more than 50,000 pounds of sulfur-impregnated carbon.

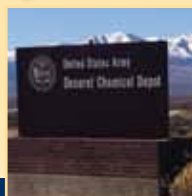


TEAM DESERET TIMELINE



JUNE 26, 1996: State of Utah grants approval to start agent operations at TOCDF

AUG. 22, 1996: TOCDF disposal operations begin with destruction of the first GB nerve agent-filled M55 rocket



JAN. 17, 1997: GB nerve agent bulk container processing begins at TOCDF

1995

1996

1997

JUNE 30, 1995 - JUNE 6, 1996:
TOCDF surrogate trial burns conducted

OCT. 2, 1996: Depot name changed back to Deseret Chemical Depot

APRIL 25, 1997: The U.S. Senate ratifies the Chemical Weapons Convention; it is entered into force April 29, 1997

In this room, constructed with 28-inch-thick, steel reinforced concrete walls, explosive components were removed from the munitions. Explosive components were cut into pieces and fed into the deactivation furnace system.

Once the explosives were removed, the munitions moved to an area where the chemical agent was drained. Other non-explosive munitions, such as bulk containers, bypass the explosive containment room on their way to being drained. The drained agent is stored in holding tanks for later disposal in the liquid incinerator.

Because some of the mustard agent has solidified over years of storage, that agent will not be drained from those munitions. Mustard bulk containers containing excessive solids are processed through the Heel Transfer System to reduce the weight of the solids to the weight amount allowed by TOCDF's operating permit.

The munition casings and bulk containers are then thermally decontaminated in the metal parts furnace.

ENVIRONMENTAL PROTECTION

Each incineration facility has a Pollution Abatement System (PAS), which removes industrial pollutants during the incineration process. The PAS cools the exhaust gases, neutralizes acidic gases and removes small particles, creating a clean water vapor (steam) that exits through the stack into the environment.

Because some of DCD's mustard agent-filled munitions and bulk containers are contaminated with elevated amounts of mercury, the TOCDF built a new PAS Filtration System (PFS), which uses sulfur-impregnated carbon to safely and effectively remove mercury from exhaust gases. The PFS ensures the facility's emissions comply with all federal, state and local standards.

To ensure maximum safety to workers, the public and the environment, the exhaust gases and the air inside the plant are regularly tested to verify that no detectable agent is present above established thresholds. Air inside the plant is measured by more than 150 state-of-the-art monitors that continually check the air and sound an alert if any potential chemical agent is detected. The monitoring systems are capable of detecting chemical agent at very low levels, well below the level at which human health effects would be possible, and conservatively within all federal and state safety requirements. To ensure the accuracy of stack monitors, they are performance tested every four hours.

SECONDARY WASTE TREATMENT

The process involved in storing and destroying chemical weapons, as well as facility closure activities, generate secondary waste. As part of their operating permit, DCD, TOCDF and CAMDS are required to dispose of their secondary waste in a safe, environmentally protective manner.

Agent-contaminated waste includes: personal protective equipment; spent decontamination solution; plastic, metal and wood materials; spent carbon filters; maintenance debris and trash. The waste is sealed in containers and placed in storage on DCD. The waste and containers are either treated on site or sent to permitted, off-site treatment facilities.

On-site treatment includes use of the TOCDF metal parts furnace to thermally decontaminate wastes associated with mustard operations. In addition, an autoclave system, located in DCD's storage area, uses a heat and high-pressure steam process to treat agent-contaminated waste, so it can be shipped offsite to a permitted facility for disposal.

Ash, metal parts, slag (*glass-like material waste generated from agent incineration*) and refractory brick lining from the furnaces are packaged and transported to hazardous waste landfills. Scrubber brine produced from the treatment of exhaust gases in the pollution abatement system is shipped to permitted facilities for treatment and disposal. Small-volume waste generated from the lab and monitoring is also sent to such facilities for disposal. Thermally decontaminated metal parts, certified agent-free, may be recycled by smelting or disposed of at a hazardous waste landfill.



SEPT. 16, 1997: First 1,000,000 pounds of GB nerve agent safely destroyed

JULY 26, 1998: Complete destruction of GB MC-1 bombs



1998

JAN. 5, 1999: More than 5,000,000 pounds of GB nerve agent safely destroyed

SEPT. 1999: CAMDS 20 year anniversary

1999

MAY 8, 2000: Agent detected in TOCDF stack; operations suspended



SEPT. 11, 2000: 10,000th on-site container delivery bringing munitions to the TOCDF for disposal

OVERSIGHT

The Army is responsible for and committed to the safe destruction of all chemical weapons

Numerous federal, state, local and even international agencies have oversight responsibilities for the Chemical Stockpile Elimination (CSE) program. Congress, the House Appropriations Committee Surveys and Investigations Team and the General Accounting Office all review the progress and expenditures of the CSE.

- Under the Chemical Weapons Convention, a team of international inspectors from the Organisation for the Prohibition of Chemical Weapons has been continually present during disposal operations to verify the destruction of chemical weapons since July 1997.
- The National Research Council of the National Academy of Sciences assists in guiding scientific and other technical aspects of the program.
- The U.S. Department of Health and Human Services oversees public health concerns.
- The U.S. Environmental Protection Agency, the Council on Environmental Quality and each state regulates and inspects disposal facilities in their jurisdictions to ensure compliance with environmental laws.
- State and county officials join with local communities to work with the Department of Homeland Security/Federal Emergency Management Agency and the Army to administer their own emergency preparedness requirements for the chemical weapons stockpile storage and disposal programs.
- Local residents are involved through their state's governor-appointed Citizens' Advisory Commission to ensure their voices are heard regarding the disposal of the chemical stockpile in their community.
- The DCD Restoration Advisory Board serves as a forum for representatives from DCD, federal and state environmental agencies, local government and residents to come together to address environmental remediation efforts at the depot.



TEAM DESERET TIMELINE

SEPT. 19, 2000: U.S. Army authorizes full restart of TOCDF operations



DEC. 25, 2001: Complete destruction of GB weteye bombs

FEB. 5, 2002: Complete destruction of GB 105mm and 155mm projectiles



2001

2002

OCT. 1, 2000: Complete destruction of GB M56 warheads



AUG. 14, 2001: Complete destruction of GB M55 rockets



MARCH 15, 2002: GB nerve agent campaign safely completed as the last GB bulk container is processed

MUSTARD AGENT OPERATIONS

Workers develop innovative solutions as they face processing challenges

Mustard agent-filled munitions have been stored at Deseret Chemical Depot (DCD) since 1942.

Approximately 46 percent of the total DCD stockpile is mustard agent, with the majority stored in bulk containers. Other mustard-filled munitions in DCD's stockpile include mortars and projectiles.

PROCESSING STRATEGY

Prior to starting the mustard campaign, workers completed initial characterization efforts to meet environmental permit requirements. For bulk containers, characterization results indicated that a portion of the DCD stockpile had hydrogen pressurization, large heels and mercury contamination. For mortars, slightly elevated levels of mercury were initially identified, but the levels were not significant enough to modify the proposed approach to process them.

In order to minimize operational delays in the TOCDF plant, a three-pronged strategy was developed to identify and process bulk containers with low heels and low mercury contamination levels while solutions to the high heel and mercury contamination problems were developed.

The first part of the strategy was a comprehensive sampling of DCD's mustard stockpile. Workers sampled the contents of every mustard agent-filled bulk container—nearly 6,400—and segregated each container based on its mercury content and/or heel size. Sampling operations also allowed workers to safely vent the pressurized containers.

Most of the mustard bulk containers were found to have low mercury levels and layers of sludge-like material called heel. The comprehensive sampling project confirmed that approximately 15 percent of the mustard bulk containers were contaminated with elevated levels of mercury and more than 50 percent had excessive heel.

To overcome these challenges, the TOCDF designed and built a heel reduction system and installed a new carbon filtration system to safely dispose of those munitions with elevated levels of mercury.

DISPOSAL EFFORTS

TOCDF began its mustard agent destruction campaign on Aug. 18, 2006, processing those bulk containers with little to no heel and little to no mercury. On Nov. 1, 2007, the TOCDF began destroying more than 54,000 155mm projectiles. These operations were successfully completed August 2008.

In the fall 2008, workers completed installation of the Heel Transfer System (HTS) to effectively deal with those bulk containers with high heel content. The HTS uses a high-pressure, warm-water spray to break up and dissolve a portion of the heel so it can be drained from the original bulk container and transferred to an empty bulk container. This process ensures the heel weighs no more than 630 pounds—the maximum weight allowed by TOCDF's operating permit—before being processed through the metal parts furnace.

(continued on page 9)

MARCH 16, 2002:

Changeover activities begin for VX nerve agent campaign

JULY 15, 2002: *Worker exposure (GB) incident at TOCDF; operations halted*



OCT. 9, 2002: *Safety Improvement Program completed following worker exposure incident*

2003

NOV. 9, 2003:

Complete destruction of VX M56 warheads

MARCH 28, 2003:
VX nerve agent campaign begins



NOV. 17, 2003:
Complete destruction of VX M55 rockets



DID YOU KNOW

A controlled detonation technology will deal with difficult munitions

- More than 300 mustard agent-filled munitions will be destroyed using an Explosive Detonation Technology (EDT) called the DAVINCH. The DAVINCH, or Detonation of Ammunition in Vacuum Integrated Chamber, is a controlled detonation system developed for chemical weapons destruction.
 - The mustard agent-filled munitions that are slated for destruction in the explosive chamber include those that have previously leaked and now are safely stored in overpack containers. The EDT will also be used to destroy the "reject" munitions—those munitions that are badly deteriorated and/or have stuck explosive components. The reject munitions pose a greater safety risk for employees, so the safer disposal method is to use the DAVINCH instead of the TOCDF.
 - Approximately 200 155mm reject projectiles and 130 4.2-inch leaking mortars will be destroyed using the DAVINCH.
- The detonation chamber will be located in DCD's Area 10. Site preparation began in summer 2010. Following state approval, operations are expected to start in early 2011.

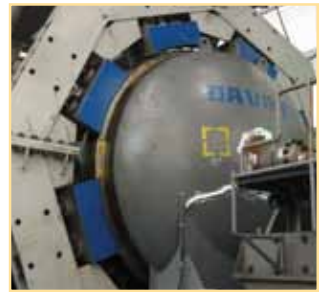
MUSTARD AGENT OPERATIONS

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In April 2009, workers began a slow, controlled startup of the 4.2-inch mortar disposal operations. During processing, sampling and analysis identified low, but higher than anticipated levels of mercury in the furnace exhaust. TOCDF officials suspected the silver solder used to assemble the weapons is the cause of the higher than expected mercury levels. As a result, mortar operations were halted until the new carbon filtration system was finished; meanwhile, TOCDF resumed processing bulk containers with low levels of mercury.

The new carbon filtration system completed full-scale demonstration tests before Utah State regulatory authorities in fall 2009. The carbon filtration system ties into the existing pollution abatement system and uses sulfur-impregnated carbon to capture mercury in the exhaust gases. With the new carbon filtration system up and running, workers began processing mercury contaminated munitions.

DCD's mustard campaign is the largest chemical agent destruction campaign the U.S. Army will undertake in its efforts to meet the nation's commitment under the global Chemical Weapons Convention Treaty. Chemical weapons destruction operations at DCD are scheduled to be completed by the treaty deadline of April 29, 2012.



WHAT IS MUSTARD AGENT?

Mustard agent is a blister agent causing chemical burns and blisters on the skin and in the lungs upon exposure or inhalation. In its pure liquid state, mustard agent is colorless. However, when exposed to impurities, it becomes a pale yellow to brown oily substance. Mustard agent freezes at 58 degrees Fahrenheit, boils (becoming a vapor with a garlic-like odor) at 419 degrees Fahrenheit and can remain active in soil for at least three years.

TEAM DESERET TIMELINE

APRIL 24, 2004:
Complete destruction
of VX bulk containers



SEPT. 12, 2004: Workers
reach 50 percent
destruction of DCD's
chemical agent stockpile



MARCH 9, 2005:
Workers commemorate
destruction of the
one-millionth munition

2004

AUG. 16, 2004: Complete
destruction of VX 155mm
projectiles



DEC. 31, 2004:
Complete destruction
of VX spray tanks

2005



GA AND LEWISITE DISPOSAL

The Deseret Chemical Depot (DCD) stockpile consists of small quantities of GA (Tabun) and lewisite agents that are stored in bulk containers. DCD is the only U.S. site to ever store these chemical agents. GA is a nerve agent that is less toxic than GB but produces similar effects. Lewisite is similar to mustard blister agent but is more toxic.

The GA and lewisite agents were slated for disposal at the Chemical Agent Munitions Disposal System, the Army's former research and development facility, which is now undergoing closure. However, unresolved technical and programmatic issues prevented this from happening.

The U.S. Army's Chemical Materials Agency thoroughly explored alternative disposal options and looked extensively at all aspects—safety, schedule, cost, work effort, shutdown and cleanup, with safety and efficiency being the primary considerations. It was determined that a separate incineration system is the process best suited to dispose of the GA and lewisite and thereby best serves the American people.

The planned small-scale liquid incinerator will be constructed and located in DCD's Area 10 chemical storage yard. The aptly named Area Ten Liquid Incinerator (ATLIC) is similar in design to TOCDF's liquid incinerators but it is smaller in scale. Workers will utilize two glove boxes to drain and decontaminate the GA and lewisite bulk containers. The ATLIC will dispose of the GA and lewisite agents and the spent decontamination solution/rinsate through high-temperature incineration. The ATLIC will also have a pollution abatement system, which will cool, neutralize and remove particulates and metals from the exhaust gases before they are released into the atmosphere.

ATLIC operations are expected to take about six months and are scheduled to be completed in time to meet the April 2012 treaty deadline.



OCT. 2, 2005: VX hydrolysate processing operations completed, safely eliminating stockpile of hazardous waste liquid and containers stored at DCD

AUG. 18, 2006: Mustard blister agent disposal operations begin with the first bulk container punched and drained



2006

JUNE 3, 2005: VX nerve agent campaign safely completed as last VX landmine destroyed



JUNE 6, 2006: Sampling project begins in DCD's storage yard (Area 10) to analyze and characterize contents of nearly 6,400 mustard agent-filled bulk containers

OUR COMMUNITY IS BETTER PREPARED BECAUSE OF CSEPP



During an annual CSEPP exercise, workers in the DCD storage area practice decontamination efforts to ensure they are prepared in the event of a real incident.

Communities located near the U.S. Army's chemical weapons stockpiles are better prepared to deal with a disaster because of the Chemical Stockpile Emergency Preparedness Program (CSEPP). Though an accidental chemical agent release at the Deseret Chemical Depot is highly unlikely, the CSEPP planning process ensures swift, appropriate actions will be taken during any crisis.

In November 1989, federal, state and local partners came together and built a fully integrated emergency preparedness program that would protect local communities while the stockpiles were being destroyed. More than 20 years later, with state-of-the-art plans, training, equipment and facilities in place, CSEPP communities have some of the most advanced emergency response

capabilities anywhere—*capabilities that make our citizens safer from all kinds of hazards.*

CSEPP focuses on providing the personnel, training and equipment necessary to have a strong emergency response infrastructure that enables emergency managers to quickly alert the public, manage the response and communicate with the public, media and emergency responders.

Emergency exercises are held each year to test the skills of everyone involved with CSEPP. The community and state join with the U.S. Army and the Department of Homeland Security/ Federal Emergency Management Agency to practice keeping the public safe in the event of an emergency.

CSEPP training provides emergency responders such as police officers, firefighters and emergency

medical teams with skills and knowledge they can use every day. Because of CSEPP, our community is one of the best prepared in the nation. And long after the depot's stockpile of chemical agent munitions is destroyed, our emergency professionals will still use the partnerships, training and equipment received through CSEPP to protect the public in the event of an emergency.

EMERGENCY PREPAREDNESS

For more information, visit or contact:

Tooele County Emergency Management

(435) 833-8100 ■ www.tcem.org

Utah Division of Homeland Security

(801) 538-3400 ■ www.des.utah.gov

Deseret Chemical Depot Public Affairs

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TEAM DESERET TIMELINE



NOV. 14, 2006: CAMDS closure activities begin under control of Tennessee Valley Authority

NOV. 1, 2007: Begin processing mustard 155mm projectiles

2007

MARCH 2007:
Autoclave system chosen to augment secondary waste disposal operations

APRIL 2008:

Construction commences on the new mercury filter system, officially known as the Pollution Abatement System Filtration System

2008



JULY 29, 2008: Mustard bulk container sampling project successfully completed 14 months earlier than scheduled

CHEMICAL WEAPONS CONVENTION TREATY OVERVIEW

On April 29, 1997, the Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on their Destruction, known as the Chemical Weapons Convention (CWC), entered into force.

The United States along with 86 other nations originally signed and ratified the CWC, agreeing to destroy all of their chemical weapons and former production facilities, as well as halt the development, use, production and acquisition of chemical weapons. Today, nearly 190 nations have ratified the CWC. Thus far, three nations have completely destroyed their chemical weapons stockpiles.

The U.S. Army Chemical Materials Agency (CMA) is responsible for safely destroying the majority of the remaining chemical weapons and related materials in the United States. The U.S. Department of Defense's Assembled Chemical Weapons Alternatives (ACWA) Program is responsible for destroying U.S. chemical weapons stored at Army installations in Kentucky and Colorado.

ACHIEVEMENTS

Since the CWC was entered into force, the U.S. has destroyed more than 2.1 million munitions and more than 32,000 tons of chemical agent, representing nearly 75 percent of its chemical weapons stockpile. In accordance with the CWC, the United States also has destroyed its existing stores of QL and DF chemicals designed for use in binary chemical munitions, and all of its former chemical warfare production facilities.

Three U.S. sites, under the direction of CMA, have completely destroyed their chemical weapons stockpiles: Johnston Atoll in the Pacific Ocean (completed November 2000), the Edgewood Area of Aberdeen Proving Ground in Maryland (completed February 2006), and the Newport

Chemical Depot in Indiana (completed August 2008). CMA continues to operate chemical weapons disposal facilities in Alabama, Arkansas, Oregon and Utah.

CHALLENGES

The CWC originally required participating countries to destroy 100 percent of their chemical weapons stockpiles within 10 years, or by April 29, 2007. In April 2006, the United States requested a five-year extension because of unforeseen challenges and delays. The Organisation for the Prohibition of Chemical Weapons (OPCW), which oversees CWC compliance, granted the request, giving the United States until April 29, 2012, to destroy its stockpile. The United States forecasts those disposal facilities under CMA's direction will meet this deadline. However, ACWA's two disposal facilities, which are currently under construction, will not be finished by 2012, but are committed to completing their stockpile destruction under international observation.

The United States will continue to destroy its chemical weapons safely, expeditiously and in full compliance with the treaty, which requires all chemical weapons to be destroyed in an environmentally safe manner. It forbids disposal by open pit burning, land burial or dumping in any body of water.

ADDITIONAL RESOURCES

For more information on CMA and its role in safely storing and destroying U.S. chemical weapons, please visit www.cma.army.mil. Detailed CWC and OPCW information can be found at www.opcw.org.



TIME-CONSUMING CHALLENGES

Because of unforeseen challenges and delays, the United States requested a five-year extension to destroy its chemical munitions, extending the deadline to April 29, 2012. Here are some of the time-consuming challenges faced by the Deseret Chemical Depot while destroying the nation's single-largest stockpile:

- Delays in obtaining environmental permits for disposal facilities
- Lower than estimated destruction processing rates
- Work stoppages to investigate and resolve problems
- Development of protocols to improve operational safety
- Deteriorating munitions requiring special handling
- Maintenance activities requiring more down time than projected
- Facility startup delays caused by additional community emergency preparedness requirements



OCT. 3, 2008: TOCDF begins using the Heel Transfer System, designed and built by TOCDF workers, to help remove solidified mustard agent in bulk containers

MARCH 2009: GA and lewisite disposal technology selected: a small-scale liquid incinerator to be constructed in DCD's storage area

APRIL 1, 2009: Processing of 4.2-inch mustard mortars begins but quickly halted due to higher than anticipated levels of mercury in the furnace exhaust

2009

Aug. 8, 2008: TOCDF completed disposal of the mustard projectiles



APRIL 1, 2009: Control of CAMDS closure activities transitions from Tennessee Valley Authority to URS (formerly EG&G Defense Materials Inc.)



CLOSURE: WHEN THE WEAPONS ARE GONE

Even before each plant has safely destroyed its stockpile of chemical weapons, the closure process begins. Closure-related work includes the decontamination, dismantling and disposal of the demilitarization facility and equipment. At the Deseret Chemical Depot (DCD), the Tooele Chemical Agent Disposal Facility and Chemical Agent Munitions Disposal System will close, while portions of DCD will be transferred to the Tooele Army Depot or managed by the Base Realignment and Closure Division (BRAC-D).

Disposal sites are governed by the federal Resource Conservation and Recovery Act (RCRA) and are known as “permitted” Treatment, Storage and Disposal Facilities (TSDFs). Individual states issue permits to TSDFs under the provisions of the RCRA. The RCRA requires that each treatment, storage and disposal facility must prepare a closure plan as part of the initial application for the operating permit. The plan must specify how and when closure will take place.



TEAM DESERET TIMELINE

- **MAY 4, 2009:** TOCDF systems contractor URS and its subcontractor Battelle are both formally awarded Star status, the highest award possible under OSHA's Voluntary Protection Program

- **JULY – AUGUST 2009:** GA nerve and lewisite blister agent sampling begins to analyze and characterize contents of bulk containers



- **JUNE 2009:** Construction completed on new mercury filter system



- **OCT. 14, 2009:** TOCDF begins operating new Pollution Abatement System Filtration System, designed with sulfur-impregnated carbon filters to capture mercury contained in some of the mustard agent munitions

While closure plans submitted at the time of permit application provide an estimated timetable, they do not define every detail in the complex closure process. As closure nears, disposal sites expand and add detail to closure plans and submit them for approval to state RCRA regulators by submitting permit modification requests.

REMEDIATION

Deseret Chemical Depot (DCD) was placed on the BRAC list effective November 2005. The BRAC states that after DCD's chemical stockpile is completely destroyed and all treaty obligations are met, approximately two-thirds of the 19,400-acre property will be transferred to the Tooele Army Depot, including storage igloos and magazines. The remaining 6,000-plus acres, which include the majority of the depot's Solid Waste Management Units (SWMUs), will be managed by the BRAC-D until cleanup can be accomplished. The SWMUs are areas that were used for the treatment, storage or disposal of chemical and conventional munitions from 1945 to 1978. More than half of DCD's 29 SWMUs have been remediated and require no further action. Surface cleanup of the two most heavily contaminated SWMUs is expected to begin in 2012.

PAST EXPERIENCE GUIDES THE FUTURE

As a world leader in chemical weapons disposal, the U.S. Army's Chemical Materials Agency (CMA) has amassed a great deal of knowledge about facility closures. This is due in part to valuable experience gained during closure operations at its Johnston Atoll Chemical Agent Disposal System (JACADS) in the equatorial Pacific Ocean, Aberdeen Chemical Agent Disposal Facility in Edgewood, Md.; and the Newport Chemical Agent Disposal Facility in Newport, Ind.

While closure is often thought of as occurring after the completion of agent destruction, the two processes may overlap. At JACADS, for example, the deactivation furnace continued to process land mines while other furnace systems and areas were simultaneously undergoing closure. Closure also includes sampling of soils and remaining structures on the property to verify that they meet regulatory standards. These "clean closure" standards vary based on each state's regulations and on the proposed future use for the property. Final closure tasks include

making a health risk assessment and an ecological risk assessment based on the data from samples of the soil and remaining structures and, ultimately, terminating the RCRA facility permit. In addition, international treaty requires that disposal equipment be certified by treaty inspectors as having been dismantled.

IT'S ABOUT PEOPLE, TOO

Dismantling and safe disposal of the physical plant is not the only significant activity during closure. Closure of a facility requires a smaller work force than that for agent destruction; workforce numbers will decline as we progress through closure. The impact of jobs lost on local economies is a community concern—the economic impact of site closure and the departure of hundreds of workers can be considerable. Planning is ongoing to help transition the workforce.

WHAT TO EXPECT DURING CLOSURE

It takes time to complete the job of closure and possible delays can be expected as the Army and its contractors work to comply with stringent regulatory standards, perform industrial systems maintenance, and decontaminate structures and equipment. Safety will, as always, remain a top priority in completing the closure mission.

Public meetings are also part of the closure process, and input from these meetings is used to improve the process for other chemical agent disposal sites. Lessons learned from public participation have been invaluable to CMA disposal facilities. CMA is committed to open communication with the public as it applies its expertise to finish the disposal and closure missions. Look for announcements and updates regarding public meetings, environmental forums, agency meetings with local government officials and the progress of closure activities.



It's all about the people—without them, it would be impossible to complete our mission successfully!



Facility decommissioning and disassembly activities from the JACADS; a glimpse of what to expect for the TOCDF.



The TOCDF will be fully decommissioned and disassembled when the chemical agent disposal operations are complete.



A future vision of the TOCDF site, following closure activities.

JANUARY 2010: Army selects controlled explosive detonation technology, the DAVINCH, to dispose of problem mustard munitions



FEBRUARY - MARCH 2010: X-ray project begins on more than 300 over-packed projectiles and mortars slated for destruction in the DAVINCH

2010



JAN. 12, 2010: TOCDF resumes processing 4.2-inch mustard mortars

May 27, 2010: Completed disposal of the 4.2-inch mustard mortars

2012

2012: Projected completion of agent destruction



TOOELE CHEMICAL STOCKPILE OUTREACH OFFICE

The Tooele Chemical Stockpile Outreach Office was opened in June 1995 to provide the public with a source to obtain information about the chemical weapons disposal program. The outreach office offers free and timely information about activities at Deseret Chemical Depot, including the Tooele Chemical Agent Disposal Facility operations and closure efforts at the Chemical Agent Munitions Disposal System. The office also provides information on the storage of chemical weapons, the Chemical Stockpile Emergency Preparedness Program, the Assembled Chemical Weapons Assessment Program and the Non-Stockpile Chemical Materiel Program.

Inside the outreach office, you will find models of munitions and the disposal facility; informative papers and technical documents; educational videos, brochures and pamphlets; and examples of protective gear worn by workers at the facility.

CALL OR VISIT THE OUTREACH OFFICE TO:

- Arrange a presentation for your organization, school, club or group.
- Request an information packet.
- Learn more about the chemical weapons disposal program.



U.S. ARMY CHEMICAL
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